2018 NEWS

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NAMRU-Dayton Participates in Tri-Service Toxicology Consortium

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DAYTON, Ohio -- Naval Medical Research Unit - Dayton (NAMRU-D) participated in the bi-annual Tri-Service Toxicology Consortium (TSTC) meeting at the U.S. Army's Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi, January 30, 2018.

"This was another successful meeting of the TSTC, it was a great opportunity for DoD scientists involved in toxicology research to coordinate research efforts and offer recommendations to improve each other's studies," said Dr. Karen Mumy, Director, Environmental Health Effects Laboratory
(EHEL) at NAMRU-D.

The TSTC connects scientists from Navy, Air Force, and Army research facilities and works to coordinate, optimize, and communicate recent toxicology knowledge, approaches, and data toward the common goal of protecting human health and the environment for the Department of Defense.

Representing NAMRU-D on-site, Dr. Mumy provided updates regarding the command's toxicology research activities. Most participants across the services attended remotely. Over the course of the day and a half meeting, 19 project updates were presented, four of which were delivered by EHEL scientists.

Dr. Frank Golich, principle investigator for a research team joining expertise from NAMRU-D's two science directorates, EHEL and Naval Aerospace Medical Research Laboratory, is testing whether low level exposure to nitrous oxide may influence, even subtly, pilot cognition or performance.

Lt. Cmdr. Matthew Shipman, aerospace physiologist, presented joint work with the Uniformed Services University of the Health Sciences to better understand the impact of shipboard exposure to volatile organic compounds (VOCs) on the human microbiome and metabolome. Results aim to provide a comprehensive exposure map of VOC exposures throughout U.S. Navy ships. According to Lt. Cmdr. Shipman, using a variety of sensors could create a deployable chemical exposure monitoring package suitable for nearly any operational environment, enhancing warfighter safety.

EHEL post-doctoral fellow, Dr. Andrew Keebaugh, is tackling the most common service-connected disability: hearing impairments. This collaborative effort with the Air Force Institute of Technology is investigating the role of sound exposure after a potentially harmful loud noise in the development of hearing loss. Using occupationally-relevant exposures, the goal of this project is to determine if permanent hearing loss from exposure to damaging levels of noise is made worse by further exposure to non-damaging noise.

Dr. Joyce Rohan, research physiologist, presented joint research efforts between NAMRU-D, U.S. Air Force School of Aerospace Medicine and 711th Human Performance Wing on the feasibility of capturing electrophysiology recordings from the brain in swine models, a never before attempted methodology.

Lt. Jed Lynn, biochemist, presented a completed study on the palatability and associated initial toxicological assessment of 2,4-dinitroanisole (DNAN), a principle component of new Insensitive Munition eXplosives (IMX) for the DoD.

Following project and service panel updates, on-site attendees were invited to tour several ERDC toxicology facilities.

"Having this tight-knit network of scientists work together across the services is the most efficient way of performing our individual and collective missions," said Dr. Mumy.

The next scheduled TSTC meeting is tentatively planned for late summer, 2018 at Wright-Patterson Air Force Base, Ohio.

Link to original story: https://dvidshub.net/r/j28nle

NAMRU-Dayton Investigators Present Research Addressing Physiological Episodes in Tactical Aviation at AsMA

05.09.2018 published, DVIDS

DALLAS, Texas – Researchers from the Naval Medical Research Unit – Dayton (NAMRU-Dayton) shared current research efforts addressing the recent unexplained physiological episodes (UPEs) observed in tactical aircraft during a panel presentation at the 89th Aerospace Medicine Association (AsMA) scientific meeting, May 6-10.

Physiologic episodes are complicated phenomena in which a variety of interacting variables such as human physiology, aircraft systems and extreme environments may play contributing roles.

“The dynamic nature of the tactical aviation environment is challenging for the development of functional and reliable sensor technologies,” said Stephanie Warner, biomedical engineer, NAMRU-Dayton.

Warner, along with NAMRU-Dayton teammates and colleagues from the U.S. Air Force School of Aerospace Medicine (USAFSAM) and the 711th Human Performance Wing (711 HPW) at Wright-Patterson Air Force Base conducted independent Verification and Validation (V&V) tests on developing sensor technologies to ensure readiness for delivery to the fleet.

NAMRU-Dayton’s Sensors Laboratory replicates the aviation environment to evaluate the effectiveness of each sensor when exposed to the operational environment and identify specific areas for improvement. This unique lab has completed developmental and independent V&V testing on the Tactical Aircrew Physiological & Cognitive Monitoring System (TAPCOMS), a number of commercially available-off-the-shelf (COTS) gas sensors, and sensors to be worn by aviators and aircrew including Vigilox, which is also known as the Aircrew-Mounted Physiologic Sensor Suite 3.0 (AMPSS 3.0).

NAMRU-Dayton research physiologist, Megan Gallo, presented research examining how low levels of carbon dioxide in the blood may elicit symptoms similar to those associated with exposure to low oxygen levels, a situation that may occur in tactical aviators. By placing transcutaneous monitors on research participants’ forehead and chest, researchers measured carbon dioxide levels during exposure to ground level, 10,000 feet, and 18,000 feet in a hypobaric chamber.

“This study identified a high degree of individual variability of transcutaneous-measured carbon dioxide levels across participants,” said Gallo, “This is important because it acknowledges that people have individual physiologic responses to hyperoxia and hypobaria, and not all people fit within textbook parameters of what is considered normal, especially in such abnormal conditions.”

Findings suggest that transcutaneous monitors successfully trend levels of arterial partial pressure of carbon dioxide during the ground level and moderate hypobaric exposures. According to Gallo, this warrants further investigation and development as a research, and possibly operational, tool.

This collaborative effort between military and industry researchers adds to the growing work on non-invasive, continuous monitoring of aircrew’s physiologic and metabolic status during flight operations.

In alignment with the Naval Aviation Enterprise, NAMRU-Dayton is committed to developing solutions to ensure the safety, health, and readiness of our naval aviators and aircrew.

AsMA is the international leader in aerospace medicine and human performance whose mission it is to apply and advance scientific knowledge to promote and enhance health, safety, and performance.

NAMRU-Dayton is a major Department of Defense (DoD) medical research command and home of the Naval Aerospace Medical Research Laboratory and the Environmental Health Effects Laboratory. NAMRU-Dayton conducts aerospace medical and environmental health effects research to enhance warfighter health, safety, performance, and readiness. We address identified Fleet needs and solutions ranging from basic knowledge to fielded technologies.

Link to original story:https://dvidshub.net/r/zru2g5

Aviation Operating Environments, Mitigating Low-Intensity Laser Threat

By: Dr. Michael Reddix
& Lt. Cmdr. Micah Kinney

07.31.2018 published, DVIDS

DAYTON, Ohio -- The Naval Medical Research Unit Dayton (NAMRU-Dayton) Vision Science Lab is evaluating low-intensity threat laser eye protection (LIT-LEP) for use in aviation operating environments. Dr. Michael Reddix, senior research psychologist, and Lt. Cmdr. Micah Kinney, aerospace optometrist, are leading this joint-service initiative in response to the U.S. Coast Guard (USCG) Office of Aviation Forces' request for assistance in mitigating the threat posed to flight safety and search and rescue operations by high-powered handheld lasers.

The rate of nighttime visible-laser cockpit illumination incidents in commercial, military, law enforcement, air ambulance, and general aviation in the continental United States continues to increase. In 2016, 7,442 incidents of aircraft laser illumination were reported to the Federal Aviation Administration (FAA), with 6,753 illumination events reported for 2017. This represents an approximately 25 fold increase in aircrew-reported illumination events compared to 2005, which reported 283 events. Regarding the U.S. Navy and Marine Corps, 249 lasing events were reported for fiscal 2015-2017. The USCG reported 159 illumination events between fiscal 2011 and 2015.

Handheld lasers can produce levels of solar radiant energy that exceed the maximum FAA exposure recommendations. Non-lethal continuous wave (CW) laser exposures can produce veiling glare, obscuring a significant portion of an aircraft windscreen while reliably reducing speed and accuracy of responses to aviation-relevant visual tasks during critical phases of flight. These factors are also capable of producing visual impairments such as temporary scotoma or a temporary disturbance in vision.

In order to meet USCG laser-threat mitigation requirements, NAMRU-Dayton partnered with the U.S. Air Force Research Laboratory's Materials and Manufacturing Directorate, Photonic Materials Branch (AFRL/RXAP) to design, manufacture, and evaluate a low-cost LEP spectacle with the goal of mitigating safety of flight risks primarily associated with laser aircraft illumination events. The LEP solution is designed to be compatible with both fixed- and rotary-wing USCG avionics.

After conducting various evaluations findings demonstrated no safety of flight issues. The team completed manufacturing quality assurance, optical engineering and psychophysical evaluations, and preliminary flight simulator and ground testing. Additional evaluations included in- and out-of-cockpit color symbol discrimination, acceptable head-up display and night-vision device compatibility, and a USCG Aviation Training Center assessment and recommendation for flight acceptance testing, August–September, 2018.

Although the prototype was designed specifically for USCG aircraft, this new technology could be applied to commercial and general aviation, air ambulance, and law enforcement aviation laser-safety requirements.

Link to original story: https://dvidshub.net/r/xeprfe

EHEL’s bench grows

By: Dr. Karen Mumy

07.31.2018 published, DVIDS

DAYTON, Ohio -- The Environmental Health Effects Laboratory (EHEL) at Naval Medical Research Unit - Dayton (NAMRU-Dayton) has a rich history in dealing with austere environments. The research group originally stood up in 1959 as the “Navy Toxicology Unit” and was charged with assessing potential health effects associated with exposure to unique operational environments. Many of those environments did not have a correlate in the public sector, such as nuclear submarines and military shipboard environments, and were therefore not being studied by those charged with protecting civilians. As EHEL nears its 60th anniversary, the lab continues to study many of the same environments, along with a host of new challenging environments, through much more advanced and sensitive scientific approaches and instrumentation, allowing deeper understanding of how these environments impact service member health and performance.

2018 became a banner year for EHEL, as we saw a 300% increase in awarded research studies and funding over recent years, as well as a diversification of its research portfolio. While the lab holds the toxicology program of record under the Navy Bureau of Medicine and Surgery (BUMED), “environmental health” encompasses much more than the classical toxicology involving the study of chemicals. Though EHEL remains primarily focused on the effects of exposure to chemicals, with a unique emphasis in inhalation toxicology, other environmental stressors have also become the focus of many research studies. These environmental stressors include hazards that service members face every day, such as extreme temperatures, altitude and noise.

Further, EHEL continues to diligently broaden our battery of health outcome assessments by incorporating additional neurological and physiological testing. This includes the integration of a number of real-time neurological tests performed with laboratory animal models during exposure. This requires the creative adaptation of many tests because these types of assessments have historically been performed after exposure.

Real-time assessments are designed to better predict effects on service members that may occur and affect health or alter performance in the moment while performing a task or mission. Many of these effects may rapidly resolve once the exposure stops, thereby making it very difficult to “catch” these effects in a research setting in an effort to understand what exactly is contributing to the effect and how.

These new approaches and research focus areas are made possible by EHEL’s exceptional research team consisting of 36 military officers, civilian employees and contract employees, 11 of which joined the team in 2018. Altogether, EHEL has expertise that range from engineering, computer programming and chemistry, to psychology, physiology, audiology and, of course, toxicology - where it all began nearly 60 years ago.

The Naval Medical Research Unit - Dayton is a major Department of Defense medical research command and the home of the Environmental Health Effects Laboratory (EHEL) and the Naval Aerospace Medical Research Laboratory (NAMRL).

Link to original story: https://dvidshub.net/r/b7msj2

Evaluating Brain Stimulation, Reducing Cognitive Effects of Stressors

By: Dr. Joyce G. Rohan

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DAYTON, Ohio -- Transcranial direct current stimulation (tDCS) is a type of non-invasive brain stimulation with a promising potential as a therapeutic method as it can partially relieve neurological symptoms associated with various disorders ranging from depression and post-traumatic stress disorder (PTSD) to Alzheimer's disease. There are investigations into the potential use of tDCS in enhancing performance of healthy subjects. Although tDCS has shown to lessen neurological impairments and enhance cognitive performance, exactly how it works remains unclear.

For the past several years, the Environmental Health Effects Laboratory at Naval Medical Research Unit Dayton (NAMRU-Dayton) has had an ongoing collaboration with U.S. Air Force 711th Human Performance Wing, Airman Systems Directorate, Battlespace Visualization Branch (711 HPW/RHCPA) at Wright-Patterson Air Force Base, Ohio. Funded by Air Force Office of Scientific Research, the joint team is studying how tDCS causes its effects, on a cellular level, using a laboratory animal model.

An obvious militarily-relevant benefit of this non-invasive brain stimulation is its potential use as a countermeasure to reduce cognitive deficits resulting from harsh environmental conditions or potential chemical hazard exposures that military personnel may face during training or deployment. Such an application of tDCS has not yet been addressed. NAMRU-Dayton, in collaboration with 711 HPW/RHCPA, has the opportunity to explore this possibility.

Recently, NAMRU-Dayton obtained funding from the Defense Medical Research and Development Program (DMRDP) to evaluate the potential use of tDCS to counteract and/or reduce negative neurological effects of extreme temperature exposures. Another main goal of this multi-year study is to characterize sex-dependent differences in the ability of tDCS to alter neurological function, as well as any sex-dependent differences with exposure to extreme temperature.

Additionally, NAMRU-Dayton obtained additional funding from the Defense Health Agency to evaluate the potential use of tDCS to reduce negative neurological effects resulting from exposure to various chemicals.

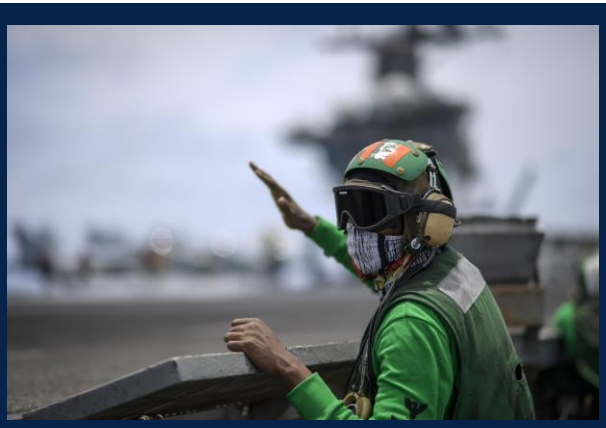
NAMRU-Dayton plans to continue our efforts in understanding how tDCS works with the central nervous system. Understanding how tDCS works on the brain is essential to develop a safe guideline for tDCS application. Establishing a safe implementation strategy for tDCS that can reduce, treat or prevent adverse neurological effects of environmental stressors and/or chemical exposures is an important undertaking that can help ensure the health and safety of our military personnel as they carryout missions.

Link to original story: https://dvidshub.net/r/o4az52

Focusing In:
Noise Impact on Hearing Loss

By: Dr. Andrew Keebaugh

07.31.2018 published, DVIDS



DAYTON, Ohio -- Protecting United States service members from noise-induced hearing loss is an ongoing focus of the Department of Defense as hearing loss is the number one disability among veterans. Noise exposure in the military can occur 24 hours a day, such as during flight operations, even in off-duty areas. For example, noise measurements in berthing areas of aircraft carriers have been found to exceed current hearing protection standards during flight operations, bringing into question what constitutes acceptable noise levels during off-duty periods following occupational noise exposures. More research is needed to understand what level of noise is sufficient during daily “effective quiet” periods that would allow for auditory recovery and prevent permanent hearing loss.

Researchers from Naval Medical Research Unit - Dayton’s (NAMRU-Dayton) Environmental Health Effects Laboratory (EHEL) are evaluating the impact of military-relevant 24 hour noise exposures on hearing loss.

A project funded by the Navy In-House Laboratory Independent Research Program (ILIR) is studying the effects of elevated steady noise levels during a recovery period (simulating the off-duty shipboard environment) after an eight hour high noise exposure at the occupational limit of 85 decibels time-weighted average. These noise exposures would not be expected to cause damage on their own, but in combination could impede auditory recovery and lead to permanent hearing loss after four weeks of exposure.

A separate study funded by the Defense Health Agency (DHA/J9) is focusing on the effects of steady and impulse noise exposures during the daily recovery period following occupationally relevant exposures to combined noise and inhaled chemical exposures.

There are many factors that can complicate risk assessment when it comes to noise exposure. Noise exposure itself is often complex and may consist of brief high-level noise impulses, in addition to steady elevated noise levels. Additionally, breathing in certain chemicals, such as the volatile organic compounds (VOCs) present in jet fuel, may worsen noise-induced hearing loss. It is unknown how these complex noise and chemical exposures will impact permanent changes in hearing, especially taking into account elevated noise levels during the auditory recovery period.

NAMRU-Dayton is currently developing a system that can study steady and impulse noise exposure for 24 hours a day with or without chemical exposure for a portion of that time. A noise generation system had been developed for prior studies at the lab, but the system was limited to use with short-term exposure chambers and could only generate steady noise. EHEL toxicologist, Dr. Andrew Keebaugh, is working with Captain Lester Morales, a student at the Air Force Institute of Technology, to design and construct a noise exposure system capable of generating high-decibel impulse noise for use in these studies.

We are also expanding our auditory testing capability to conduct functional assessments of peripheral and central hearing. Dr. Rachel Howes, an audiologist, recently joined the NAMRU-Dayton team to assist EHEL with audiology measurements and analysis.

The research team at EHEL is committed to protecting our service members from noise-induced hearing loss by using our unique facilities to support the effort.

Link to original story: https://dvidshub.net/r/ox46mv

Vestibular Research Expands at NAMRU-Dayton

By: Dr. Richard D. Arnold

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DAYTON, Ohio -- The effects of vestibular phenomena on operator health, readiness, and performance are numerous. From traumatic brain injury-related balance dysfunction to motion-sickness to pilot spatial orientation, the relevance of the vestibular system to key operational problems is significant. After several years of re-building under the Naval Medical Research Unit Dayton at Wright-Patterson Air Force Base, Naval Aerospace Medical Research Laboratory's (NAMRL) vestibular research program is poised to regain its historical position as a world leader.

NAMRL, originally located on Naval Air Station Pensacola, enjoyed a long and distinguished position at the forefront of vestibular research for many years. Such figures as Capt. Ashton Graybiel and Dr. Fred Guedry established the lab as a leader in the field throughout the latter half of the 20th century. However, a substantial loss of scientific staff associated with the lab's 2010 move to WPAFB led to a much reduced vestibular research capability. Now, new facilities and the re-establishment of a core of expert researchers are the catalysts for this resurgence.

Today, the lab features several important research devices at the Dayton facility. The Visual-Vestibular Sphere Device (VVSD) contains a rotating chair surrounded by a rotating enclosed sphere designed for conducting basic research on vestibular and visual interactions. The Vertical Linear Accelerator affords up to 20 feet of vertical motion, while the Neuro-Otologic Test Center provides a precisely programmable rotating chair in a light-tight chamber. Most significantly, the lab received the long-awaited Disorientation Research Device, or the Kraken™ in October 2016. The Kraken™ is a six axis-of-motion research device that will support a range of basic and applied research on vestibular and acceleration effects. Data collection began on the first research project to use the Kraken™, June 2018, as part of a joint effort with NASA Langley Research Center to investigate and mitigate pilot spatial disorientation in commercial aviation.

Even more important than facilities to the resurgence of vestibular research is the re-establishment of a core of expert researchers. A series of motion sickness studies now led by Lt. Cmdr. Matt Doubrava, identified an intranasal formulation of scopolamine as a promising countermeasure. Lt. Adam Biggs, research psychologist, established a new capability studying the effects of virtual reality and augmented reality displays on motion or cyber sickness.

We recently welcomed a world-leading vestibular researcher to our ranks, Dr. Dan Merfeld, formerly of Massachusetts Eye and Ear Institute at Harvard Medical School and jointly recruited by NAMRU-Dayton and The Ohio State University (OSU) now serves as NAMRU-Dayton's senior vestibular scientist through an Intergovernmental Personnel Act appointment from the OSU Department of Otolaryngology at the OSU School of Medicine.

Dr. Merfeld is working alongside our researchers, including Dr. Henry Williams, supervisory research psychologist and Capt. Richard Folga, aerospace physiologist, to develop vestibular models of pilot spatial orientation. Dr. Merfeld is expanding the reach of the lab, helping to recruit several visiting scientists and establish research collaborations with leading vestibular researchers at Massachusetts Institute of Technology, Johns Hopkins University, Brandeis University, and the University of Colorado. Further, Dr. Merfeld is taking on the principal role in a joint initiative NAMRU-Dayton is pursuing with OSU to formally recognize and promote central and southwest Ohio as a national-level center for vestibular research through the capabilities of OSU, NAMRU-Dayton, and other institutions, such as the U.S. Air Force 711th Human Performance Wing at WPAFB.

NAMRU-Dayton and OSU are developing a framework to address clinical issues such as balance dysfunction and dizziness, and operational issues such as motion sickness and pilot spatial disorientation. In support of this initiative NAMRU-Dayton and OSU are organizing a vestibular oriented research conference to be held in Dayton, Ohio, spring 2019.

The Naval Aerospace Medical Research Laboratory is equipped with capabilities in acceleration and sensory science, biomedical, and engineering and technical services, all of which are supported by a unique collection of state-of-the-science research devices. Our unique research portfolio enables researchers to transition validated knowledge and effective technologies to the fleet, mitigating and preventing leading factors associated with aeromedical mishaps.

Link to original story: https://dvidshub.net/r/noa9eh

NAMRU-Dayton Environmental Physiology Team Tackles Naval Aviation's Top Priority: Physiological Episodes

By: Dr. Richard D. Arnold

07.31.2018 published, DVIDS

DAYTON, Ohio -- Protecting aircrew against a wide range of physiologic challenges posed by the tactical aviation environment is a primary driver of research priorities at Naval Medical Research Unit – Dayton. With the growth of unexplained physiologic episodes (PE) being reported across U.S. Navy and U.S. Air Force aircraft platforms, NAMRU-Dayton is responding to the challenge. We are rapidly expanding our environmental physiology research capacity by adding experienced altitude effects researchers and developing new laboratory facilities.

The Naval Aerospace Medical Research Laboratory (NAMRL) at NAMRU-Dayton expanded its research portfolio of PE related studies from about five per year prior to fiscal year 2017 to 25 unique PE related research protocols in fiscal year 2018. Research topics include the effects of barometric pressure changes, the effects of variable breathing gas mixtures, and the effects of breathing resistance on aircrew physiology and performance. The lab is developing and testing a range of physiologic, gas, and chemical sensors for use as in-flight PE detection and mitigation tools.

NAMRL is not alone in the fight to understand and mitigate PEs. The Environmental Health Effects Laboratory (EHEL) at NAMRU-Dayton is conducting research to characterize the potential role of chemical contaminants in PEs. EHEL is collaborating with NAMRL to conduct more extreme environmental exposure protocols than NAMRL can accomplish through its human-use research program.

NAMRU-Dayton is strengthening collaborative relationships with Department of Defense laboratories including Naval Medical Research Center, Naval Health Research Center, Naval Submarine Medical Research Laboratory, NAMRU- San Antonio, Naval Air Warfare Center (Aircraft and Training Systems divisions), Navy Experimental Diving Unit, USAF 711th Human Performance Wing, and US Army Aeromedical Laboratory. Additionally, NAMRU-Dayton is working with academia and industry partners including Case Western Reserve University, Florida Institute for Human and Machine Cognition, and KBRwyle to conduct research and development (R&D) in response to the rise of in-flight physiologic episodes.

The command continues to receive R&D support from long-term line stakeholders like NAVAIR. More recently, non-traditional sponsors of aeromedical research such as Defense Health Agency (DHA) and Bureau of Medicine and Surgery (BUMED) have enabled the lab to mount a substantial response to the threat of PEs to DoD aircrew.

In support of the lab's planned research NAMRL is constructing a new respiratory physiology laboratory that will aid studies on the effects of four factors; (1) variable breathing gas mixtures, (2) in-line breathing resistance, (3) breathing gas pressure and flow disruptions, and (4) flight equipment fit on aircrew physiology and cognitive function. To support these initiatives NAMRL is building several aircraft-specific life support system (LSS) simulators to reproduce the breathing environments of the T-45 and F/A-18 aircraft, for example.

Due to this surge in PE-related research NAMRL has added a number of senior scientific staff with experience in respiratory physiology research. Most recently Drs. Dan Warkander and Barbara Shykoff joined the team, bringing collectively over 40 years of research experience in respiratory physiology and life support system design through their previous work at University of Buffalo and Navy Experimental Diving Unit. Such additions to the staff bolster an already excellent cadre of altitude effects researchers.

Research experts at NAMRU-Dayton are equipped to lead the Navy's research response to in-flight physiologic episodes our military is facing.

Link to original story: https://dvidshub.net/r/dmgfje

Ceremony Marks Command's Recent Change in Leadership

08.21.2018 published, WPAFB

DAYTON, Ohio -- Naval Medical Research Unit Dayton (NAMRU-Dayton) held a change of command ceremony where Captain Rees L. Lee relinquished command to Captain Matthew W. Hebert at Wright-Patterson Air Force Base, Friday, August 6.

Rear Admiral Paul Pearigen, commander, Navy Medicine West addressed ceremony attendees and members of the official party as the Presiding Officer. “It is a distinct honor and privilege for me to be here today as we gather to mark this transfer of authority, responsibility, and accountability from one accomplished naval officer to another,” said Pearigen.
As NAMRU-Dayton commanding officer, Lee supported the success of the two science directorates, the Naval Aerospace Medical Research Laboratory and the Environmental Health Effects Laboratory in addition to the support staff.

“I really had no idea the tremendous challenges and successes that were in store. To say that this Command tour has been rewarding would be a woeful understatement,” said Lee.

During Lee’s tenure command continued to respond to the needs of the military by increasing the size of the scientific staff by over 60 percent.

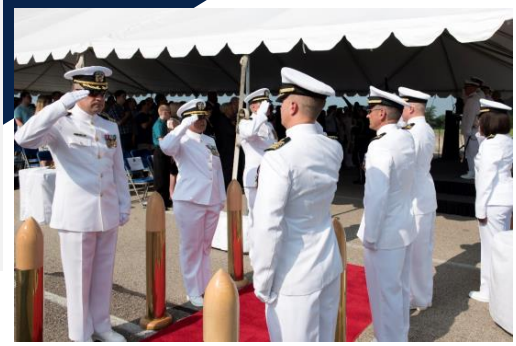
“When Naval Aviation needed to understand physiologic episodes affecting some of our fighter pilots, you responded, by developing 23 new initiatives, quadrupling the funding dedicated to this effort,” said Lee.

According to Lee, the success of NAMRU-Dayton is dependent on the mutual support of many, many collaborators. “We have an abundance of support from across the state,” said Lee.

Lee will report as Naval Surface Force Atlantic Force Surgeon for his next assignment.

NAMRU-Dayton’s new commanding officer, Capt. Hebert, is an aerospace physiologist and seasoned in Navy Medicine and the Naval Aviation Enterprise.

“I’d like to humbly thank the chain of command for the privilege and your trust to lead the women and men of the Naval Medical Research Unit Dayton. I cannot think of a finer group of professionals by reputation and by accomplishment that are employed here. You have my promise to do everything under my influence and to work tirelessly on the mission, foster camaraderie, and to ensure that all professional challenges provided to this command exceed expectations,” said Hebert.



Link to original story: https://www.wpafb.af.mil/News/Article-Display/Article/1608498/ceremony-marks-commands-recent-change-in-leadership/

Navy Scientists Look to Improve Safety in Low Oxygen Environments

08.23.2018 published, DVIDS

KISSIMEE, Florida -- Researchers from the Naval Medical Research Unit Dayton (NAMRU-Dayton) presented human performance research during a breakout session at the 2018 Military Health System Research Symposium (MHSRS) in Kissimmee, Florida, Aug. 22.

“This research study aims to improve safety in a variety of tasks that might occur in low oxygen environments, such as our aircrew and diving communities,” said Lt. Todd Seech, aerospace experimental psychologist and co-investigator.

By examining the efficacy of an electroencephalography (EEG) signal complex, known as a Mismatch Negativity/P3a, Navy researchers may be able to predict the onset of performance deficits in low oxygen environments earlier and more accurately than pulse oximetry.

Test subjects completed two testing sessions on separate days that differed only in simulated altitude environment. One session occurred at 17,500 feet and the other session occurred at 500 feet. In both, participants performed a continuous hand eye coordination task while EEG and finger pulse oximetry were recorded. The study procedures took place in NAMRU-Dayton’s Reduced Oxygen Breathing Environment (ROBE).

Initial results suggest EEG may serve as an early predictor of performance decline during exposure to low oxygen. The amplitude of the awareness was reduced in the hypoxia compared to the normoxia condition suggested an impairment in attentional reorienting.

“With further development, EEG may represent a sensitive method for detecting hypoxia prior to symptom onset and performance decrement in pilots,” said Dr. Kara Blacker, research psychologist, contractor with Henry M. Jackson Foundation for the Advancement of Military Medicine assigned to NAMRU-Dayton.

MHSRS is the Department of Defense’s (DoD) premier scientific conference bringing together scientists, academia, and industry to exchange information on research and health care advancements. Research areas include combat casualty care, military operational medicine, clinical and rehabilitative medicine, and military infectious disease research programs.

The Naval Medical Research Unit Dayton is a major DoD medical research command and the home of the Naval Aerospace Medical Research Laboratory and the Environmental Health Effects Laboratory. As a subordinate command to Naval Medical Research Center, NAMRU-Dayton conducts aerospace medical and environmental health effects research to enhance warfighter health, safety, performance and readiness. We address identified Fleet needs and results in products and solutions ranging from basic knowledge to fielded technologies.

Link to original story: https://dvidshub.net/r/3oeo7k

KISSIMEE, Florida -- NAMRU-Dayton investigators presented collaborative work at MHSRS 2018. Our Navy researchers connected with military medical providers who have deployment experience so that we may better understand the needs of the service member.

Navy Research Command Prepares Future Scientists

10.05.18 published, WPAFB

DAYTON, Ohio -- This summer, Naval Medical Research Unit Dayton (NAMRU-Dayton) welcomed its largest cohort of interns to the command for a time of learning, mentorship and comradery. Composed of secondary to graduate level students, the group had the opportunity to dive deep into their fields of interest, gain solid work experience, learn about the Navy, and form lasting memories with command members.

Each summer, NAMRU-Dayton welcomes high school, undergraduate, and graduate students from across a variety of Science, Technology, Engineering and Mathematics (STEM) fields through partnerships such as Oak Ridge Institute for Science and Education (ORISE) and the Science, Mathematics And Research for Transformation (SMART) Scholarship. Both the ORISE and SMART Scholars programs offer paid opportunities for students to gain practical knowledge, educational experience and mentorship guidance.

High school students Alex Folga and Ryan Williams used their time at NAMRU-Dayton to discover fields of interests, while undergrads Samantha Keller, Jesse Leiffer, Brendan Gallagher, Kiersten Compton and Ashton Hughes put their developing knowledge to practical use in fields as varied as public health, mechanical and biomechanical engineering and cognitive psychology.

NAMRU-Dayton returnee Mackenzie Riggenbach, a rising senior at Ohio Northern University, used her knowledge from her previous internship to develop and conduct her own study over the summer.

“I’ve learned so much about running a lab and conducting research at NAMRU-Dayton,” said Riggenbach. ”This experience has helped me broaden my knowledge of cognitive psychology.”

Several interns reflected on the work experience they gained during their time at the command.

“I wanted the opportunity not only to learn, but contribute while doing so,” said Dominic Pistone, a rising sophomore at Wright State University. “I heard this was a place where I would be able to do both.”

Jon Simmel, master’s degree candidate at The Ohio State University, agreed with the sentiment. “The best part has been the freedom I’ve been given to creatively tackle interesting problems,” said Simmel. “The principal investigators have been gracious enough to allow me the opportunity to apply my engineering and design knowledge to develop methodologies for a study rather than simply executing it.”

For Daniel McHail, a SMART scholar and neuroscience doctorate student, the internship was just the beginning of his time with NAMRU-Dayton which was “his top to choice when [he] applied through the SMART program.” McHail will return to the command as a civilian scientist employee once he completes his degree. “This internship has allowed me to rotate through so much of the aerospace medical laboratories here which will definitely inform the projects I develop when I return as a principle investigator next year.”

NAMRU-Dayton is committed to preparing future scientists to uphold our mission of maximizing warfighter performance and survivability through premier aerospace medical and environmental health research by delivering solutions to the field, the fleet and for the future.

Link to original story: https://epaper.daytondailynews.com/popovers/dynamic_article_popover.aspx?guid=af74b9da-9613-4a8b-b7a2-9413a5f00049&pbid=1629e6e2-411a-4732-826a-7ce1c535407f&utm_source=app.pagesuite&utm_medium=app-interaction&utm_campaign=pagesuite-epaper-html5_share-article

2018 Navy Junior Optometrist, NAMRU-Dayton Scientist

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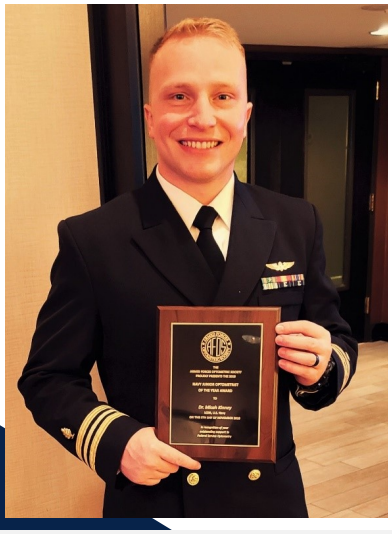

SAN ANTONIO, Texas - Lt. Cmdr. Micah Kinney, Naval Aerospace Optometrist (OD) assigned to Naval Medical Research Unit Dayton (NAMRU-Dayton), received the 2018 Navy Junior Optometrist of the Year award from the Armed Forces Optometric Society (AFOS) during the Federal Service Optometry Meeting in San Antonio, November 5.

The AFOS award recognizes significant contributions to the advancement of AFOS and Optometry.

“I was surprised considering how many great ODs we have serving the Navy. I know there are many of my colleagues out there doing great things to support the warfighter and it is a huge honor to have been selected,” said Lt. Cmdr. Kinney.

For Lt. Cmdr. Kinney serving in the military has led to learning from professionals not only in his field but in many other fields in medicine and military settings. “Having the opportunity to receive mentorship is priceless,” he said.

At NAMRU-Dayton Lt. Cmdr. Kinney works with the vision science team at the Naval Aerospace Medical Research Laboratory (NAMRL) and is the Department Head for the Acceleration and Sensory Sciences Department.

“I am excited for the great things we are doing at NAMRU-Dayton. We have been very fortunate to work with our Air Force colleagues to address eye protection for the U.S. Coast Guard aviation fleet,” said Lt. Cmdr. Kinney. The final phase of flight testing of USAF prototypes is set to begin in January 2019.

In addition, Lt. Cmdr. Kinney is supporting a joint project between NAMRU-Dayton and Naval Aerospace Medical Institute (NAMI), Pensacola looking at the impact of reduced vision on aviator performance. The study is geared to help guide waiver and return to duty policy for U.S. Navy and U.S. Marine Corps aviation personnel.

Since Lt. Cmdr. Kinney was a kid he wanted to serve our country. Growing up around the Marines and Navy as a boy in North Carolina he said, “He always carried a high respect for those who served.”

“When the opportunity arose for me to use my professional skills to help make sure that Marines, Sailors, and aviators can do their jobs at their best, I jumped at the chance,” said Lt. Cmdr. Kinney.

“My work with the vision science team here at NAMRU-Dayton and my prior assignments have helped guide policy, enhance warfighter performance, and ultimately helped those who protect our freedoms,” said Lt. Cmdr. Kinney.

NAMRU-Dayton’s vision science lab research efforts are comprised of color vision assessment for special-duty occupations, the impact of laser veiling glare on aviator human performance, special duty vision standards, human visual performance in chem-bio operating environments, and weapon-platform specific eye protection test and evaluation.

Link to original story: https://dvidshub.net/r/98g7yq

Research through Collaboration, ONR Global Visiting Scientist at NAMRU-Dayton

11.27.2018 published, DVIDS

DAYTON, Ohio -- Advancing basic research through collaboration continues to be essential to NAMRU-Dayton. Recently, team members of our Engineering and Technical Support Services Department worked and learned from Johann Schwandtner, mechanical engineer at AMST, Austria and visiting scientist from the Office of Naval Research Global (ONRG) Visiting Scientist Program.

“The benefit of working with Johann was the insight we gained from his experience developing motion algorithms for the Desdemona, a motion device similar to the Kraken. The knowledge of individuals like Johann is an invaluable tool for helping to avoid set-backs and providing heading toward the highest quality motion control methods,” said Cortland Etgen, Oak Ridge Institute for Science & Education participant working at NAMRU-Dayton.

Etgen is the motion team lead for the Kraken™, which means he designs motion control algorithms for the device and researches new control strategies for improved motion realism. Essentially, calculations are packaged and sent as commands for the Kraken to properly respond to.

The ONR Program supports short-term travel opportunities for foreign/international scientists to the United States to socialize new Science & Technology ideas or findings with the Naval Research Enterprise.

Patrick Rose, Science Director for Synthetic Biology at the London Office ONRG, said “the Visiting Science Program allows ONRG to help build long-term partnerships for Naval Research & Development with globally leading technology hubs for little investment from the Navy's side.”

“International scientists are often eager and excited to get the exposure and develop new partnerships with the Navy,” said Rose, “The result is that the Naval Research Enterprise is able to explore new avenues of technology development for current research challenges.”

According to Captain Richard Folga, Head of the Engineering and Technical Support Services Department at NAMRU-Dayton, “Johann represents the only other organization in the world doing what we do with a wealth of operational experience conducting training and research with the Desdemona.”

As a part of the command mission our scientists work to mitigate spatial disorientation through collaborative research efforts.

“The insight that AMST could provide us in developing our offline motion control solutions translates into achieving our goals for spatial disorientation mitigation,” said Capt. Folga. “I think ONR Global is a great outlet for that collaboration.”

To close his time at NAMRU-Dayton, Schwandtner held a seminar to discuss his focus at AMST, Austria, which is researching and developing design optimizations for various flight simulations.

“The Desdemona program has a full ten year head start on us at NAMRU-Dayton. We built our motion control team from the ground up with very little experience,” said Capt. Folga.

Less than two years since completing operator training and developing motion washout capability necessary for authentic man in the loop control of aircraft or other vehicles, the Kraken™ team completed the first research project with NASA and is preparing for the next.

Link to original story: https://dvidshub.net/r/j5azje

Optimizing Personnel Selection, Unmanned Aircraft Systems

12.18.2018 published, DVIDS

DAYTON, Ohio -- A multi-institution research team completed a four-year collaborative project to develop a reliable and valid selection test for unmanned aircraft system (UAS) operator candidates within the Navy and Marine Corps with applicability across the Department of Defense (DoD). The project is called Selection of UAS Personnel, or SUPer.

“The use of UAS has increased significantly in recent years across the DoD. Unlike manned aviation, these platforms represent a unique new domain which currently has no validated tools for selecting and classifying UAS operator candidates,” said Commander Tatana Olson, SUPer’s government lead and deputy director of Naval Aerospace Medical Research Laboratory (NAMRL) at Naval Medical Research Unit Dayton (NAMRU-Dayton).
Sponsored by the Office of Naval Research, Cmdr. Olson and Dr. Henry Williams, NAMRL senior scientist, worked with Naval Aerospace Medical Institute (NAMI), Air Force Personnel Center, 711th Human Performance Wing, U.S. Naval Air Systems Command and Georgia Institute of Technology and transitioned the SUPer test battery to NAMI where it will be maintained and administered by NAMI for future UAS operator selection applications.

SUPer, a large and complex study, involved lab data collection at Georgia Tech and field data collection at 11 sites across the country. Portions of the prototype selection test were administered to more than 1,500 individuals, assessing memory, spatial, math/quantitative, science/technical knowledge, and perceptual speed.

Effective personnel assessment and selection procedures identify individuals who possess a minimum level of qualifications and the aptitude to acquire the relevant knowledge, skills, and abilities to perform specific tasks and missions.

“Done properly, selection procedures minimize training attrition, improve retention, and enhance the quality and satisfaction of the workforce, ultimately reducing overall manpower costs,” said Cmdr. Olson.

Participants for the lab studies at Georgia Tech consisted of people between the ages of 18 and 25, and were conducted to assess the selection battery’s construct validity, reliability, and predictive validity using a UAS simulation developed for the project.

Participants for the field studies consisted of UAS trainees, basic recruits, flight students, and UAS operators assessed the extent to which performance on the test was predictive of work and training outcomes. Results showed that the ability factors assessed in the test battery were reliably and significantly related to individual differences in UAS training performance and completion.

By integrating with the Navy’s existing aviation selection testing architecture the test can be delivered via the Navy’s secure web-based test delivery platform in just over one hour, according to Cmdr. Olson.

“As the Department of the Navy moves forward on executing its strategic roadmap for unmanned systems, this test will ensure the selection of the most capable UAS operator candidates and serve as a critical component of the successful development and management of UAS career fields across the Navy and Marine Corps,” said Cmdr. Olson.

Link to original story:https://dvidshub.net/r/zkravt